

## MODULAR OFFICE FURNITURE

### Reference to Related Applications

This application claims priority from U.S. provisional patent application Serial No. 60/294,790, filed May 31, 2001, the entire contents of which are incorporated herein by reference.

### Field of the Invention

This invention relates generally to knock-down type structures and, in particular, to office furniture that may be easily assembled and disassembled using covered tubular members.

### Background of the Invention .

In the realm of office furniture, the trend has been away from solid and permanent installations to flexible configurations that may be easily altered to suit new working conditions. This trend probably grew out of mobile computing environments, where individual workers may need to temporarily perform services in one of a variety of different locations. This trend toward modular, flexible working environments is also strengthened by the diverse needs of different workers, in terms of table space, storage area, the need for privacy, and other factors.

Summary of the Invention

A modular office cubicle system according to the present invention includes a plurality of vertical members which each have lower ends configured to rest on a floor. A plurality of horizontal members extends between the vertical members such that the vertical and horizontal members cooperate to form a skeletal work cubicle at least partially surrounding a work area. Structural connection fittings removably interconnect the horizontal members with the vertical members. Removable and replaceable polymerized sheathing surrounds at least some of the plurality of vertical members and some of the plurality of horizontal members. A generally planar worktop is preferably supported by some of the members in a generally horizontal position.

Brief Description of the Drawings

Figure 1 is a perspective view of an embodiment of a modular office cubicle system according to the present invention;

Figure 2A is a perspective view of one embodiment of a structural fitting for use with the present inventions;

Figure 2B is a perspective view of another embodiment of a structural fitting for use with the present invention;

Figure 2C is a perspective view of yet another embodiment of a structural fitting for use with the present invention;

Figure 3 is a perspective view of a basic embodiment of the present invention;

Figure 4 is a perspective view of a pair of modular office cubicle systems according to the present invention arranged side-by-side;

Figure 5 is a perspective view of a portion of an infill panel and one embodiment of a support member for supporting the infill panel.

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### Description of the Invention

10 Broadly, this invention addresses the need for modular office furniture by providing partitions, work surfaces, storage facilities, and so forth, constructed using tubular metal members covered with polymeric material, resulting in a structure that may be easily assembled, modified and disassembled, while, at the same time, may assume different shapes, colors and other appearances with little, if any, maintenance.

15 A basic module according to the invention is shown at 100 in Figure 1. This particular configuration includes a back wall 102, two side partitions 104 and 106, and an L-shaped extension 108, all constructed using tubular members such as 110, joined by fittings such as 112. Infill panels 114 and 116 may be used, as desired, as shown in the back wall 102 and a portion of the side partition. In between the partitions 104 and 106, in the preferred embodiment there is hung an upper storage cabinet 118 and work surface 120.

20 *Sub a-3* The tubular members 110 are preferably circular in cross-section, and are covered with a polymeric material such as polyethylene, polypropylene, nylon, or other suitable material, affording changes in color while reducing maintenance. Preferably, the members are aluminum, though steel or even certain plastics may be used. The vertical

members are preferably constructed onto casters 120, enabling the entire modular to be rolled from place to place in conjunction with one or more chairs. The fittings may be L-shaped, T-shaped, or have multiple, orthogonal axes, as appropriate, and the sheathing may either extend into the fitting, or be flush therewith, as shown in Figures 2A and 2B.

The vertical and horizontal members 130 and 134 preferably are hollow metal tubes. Polymerized sheathing fits around the outer diameter of the tubes and extends substantially the entire length so as to give a durable and aesthetically pleasing appearance. The sheathing has an inner diameter equal to or slightly greater than the outside diameter of the metal tubes.

10 Referring again to Figure 1, a modular office cubicle system according to the present invention will be described in more detail. This system preferably includes a plurality of vertical members 130 each having lower ends 132 configured to rest on a floor. In some embodiments, the lower end 132 comprises a caster for easy mobility of the cubicle system 100. A plurality of horizontal members 134 extend between the

15 vertical members such that the vertical and horizontal members cooperate to form a skeletal work cubicle at least partially surrounding a work area 136. Structural connection fittings removably interconnect the horizontal members with the vertical members. Structural connection fittings for use with the present invention come in several varieties, such as shown in Figures 2A, 2B, and 2C.

20 A preferred embodiment of the structural fitting is shown in Figure 2C at 140. The structural fitting 140 has a base 142 with a radiused end surface 144. The radiused end surface 144 is designed to fit against the outer surface of one of the vertical or

horizontal members. Preferably, this radiused end surface 144 fits against the outside diameter of the polymeric sheathing on one of the tubular members, such as a vertical member. The base 142 is fastened to the member against which the radiused end surface fits by a concentric fastener that extends through the center of the base and into the member. An engagement member 146 extends from the base 142 and is configured to engage the inner diameter of one of the tubes such as shown on 148. The tube 148 is preferably another hollow metal tube with a polymeric outer sheathing, not shown. The engagement member 146 preferably comprises a pair of engagement fingers 150 and 152 that have generally arcuate outer surfaces designed to fit into the interior diameter of the tube 148. The fingers may be a slip or press fit into the tube 148. However, the fitting 140 preferably includes a fastener such as set screw or bolt 154 that engages a threaded hole 156 in one of the fingers 150. The screw 154 presses against the inside of the other finger 152 such that when the screw 154 is tightened, the fingers 150 and 152 are spread apart. Therefore, the tube 148 may be placed onto the fingers 150 and 152. The screw 154 is then passed through a hole in the tube 148 and engages the hole 156 in the finger 150. As the screw is tightened, the fingers 150 and 152 are spread apart so that they tightly engage in the inside of the tube 148. This type of structural fitting can be seen throughout the modular office cubicle 100 as shown in Figure 1, and as indicated in several places as 140. Preferably, the fitting 140 gives a very flush and finished appearance. The base 142 has an outer diameter equal or similar to the outer diameter of the tube 148, or, most preferably, the sheathing that covers the tube 148. Therefore, the base 142 smoothly transitions to the tube it connects to. In some of the embodiments, the

horizontal and vertical members are tubes of the same diameter. In this case, the end surface 144 of the base 142 has a radius the same as the radius of the side surface of the base 142.

Figure 2A shows an alternative structural connection fitting 160. This fitting 160 is elbow-shaped and includes an engagement finger -similar to the fitting 140. As can be seen in Figure 1, the fittings 140 may be used to interconnect horizontal members 134 to the side of vertical members 130. Alternatively, an elbow fitting could be used such as shown in Figure 2A. The elbow fitting 160 may have engagement fingers on both of its ends, or a different type of fitting on one of its ends. The fittings 140 and 160 are considered to be slip-in fittings since the engagement fingers slip inside of the tubes to which they connect.

sub 22 Figure 2B shows an alternative slip-on fitting 162. The fitting 162 is shown as an elbow fitting, but may be provided with many other shapes. Likewise, the fittings 140 and 160 may come in other shapes, such as T-shaped elbow, elbow, four-way, and more complex fittings. The fitting 162 has an opening 164 in one of its legs that has an inside diameter equal to or slightly larger than the outer diameter of a tube 166 or its polymerized sheathing 168. If it is sized slightly larger than the tube 166, the tube is slid into the opening 164 and preferably a set screw 170 is tightened to push against the outer surface of the tube 166. The sheathing 168 then may be slid up flush against the end of the fitting 162 to give a finished appearance. Alternatively, the opening 164 may have a larger diameter such that the tube 166 and outer sheathing 168 both slide into the opening 164. The set screw 170 can then be tightened against the outer sheathing. The set screw,

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in this embodiment, preferably has a rounded end such that it presses against the outer sheathing and locks the tube 166 and sheathing 168 into the fitting 162 without penetrating the sheathing 168. Ultimately, it may penetrate the sheathing. The fittings such as shown in Figures 2A-2C are preferably fittings available from Hollaender, with the slip-in fittings known as Interna-Rail®.

Referring now to Figure 3, a modular office cubicle system according to the present invention, consisting only of vertical and horizontal members and the structural fittings used to interconnect them, is shown at 200. This embodiment of the present invention may be considered to have a first side partition 202, a second side partition 204, a back wall 206 extending between the side partitions 202 and 204, a side wall 208 extending from one of the side partitions 204 and a front wall 210 extending from the side wall 208. Each of the side partitions 202 and 204 have a ladder-like configuration and are preferably identical to one another. Side partition 202 includes a pair of vertical members 212 and 214 that are generally parallel to one another and spaced apart. Five generally parallel horizontal members 216 extend between the vertical members 212 and 214 and are spaced apart from one another at intervals much like rungs of a ladder. The horizontal members 216 are preferably interconnected with the vertical members 214 by a plurality of structural connection fittings 140. The side partition 204 is constructed similarly. The rear wall 206 extends from the rearmost vertical member of each of the side partitions and preferably includes two or more horizontal members 220. Vertical members 222 may interconnect the horizontal members 220.

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The side wall 208 extends from the forwardmost vertical member of the second side partition 204 and is aligned therewith. It includes multiple horizontal members 224 that extend from the side partition 204 to a vertical corner member 226. The front wall 210 extends preferably perpendicularly from the side wall 208. It preferably includes several horizontal members 228 that extend from the corner member 226 to a vertical end member 230. As will be clear to those with skill in the art, the various elements of the cubicles 100 and 200 may be arranged in other manners than those illustrated without departing from the scope of the invention. The ladder-like side partitions 202 and 204 provide particular utility. Referring again to Figure 1, the storage cabinet 118 and the generally horizontal worktop 120 may be supported from "rungs" of these side partitions.

Referring again to Figure 3, the various horizontal and vertical members define a plurality of generally vertical framed areas such as 240. Infill panels may be supported in any or all of the framed areas as needed to provide privacy or functionality. Figure 5 shows a preferred fastener 250 for supporting an infill panel 252. Infill panels may be mesh panels, solid panels, fabric covered, sound absorption panels, corkboard, or any other type of panel desired for the application. The panels may also be easily changed to provide different functionality or to update the appearance of the cubicle. The infill panels preferably consume substantially all of the framed area in which they are placed. A small gap may surround the perimeter of the infill panel to give room for the connectors 250.

Figure 4 shows two cubicles 300 and 302 positioned side-by-side. These cubicles 300 and 302 may be interconnected using multi-axis or diagonal fittings, or two adjacent



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cubicles may share portions, such as a side portion. That is, the side portion in between two cubicles may form part of each of the cubicles, thereby interconnecting the cubicles. The casters may also be removed in a more permanent installation.

As will be clear to those of skill in the art, the illustrated embodiments of the present invention may be altered in various ways. However, such variations do not depart from the scope or teaching of the present invention.

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